THE OPERATIVE TREATMENT OF CLEFT PALATE.[1]

WITH A REPORT OF EIGHT CASES.

BY CHARLES H. PECK, M.D.,
OF NEW YORK,
Attending Surgeon to the French Hospital; Assistant Attending Surgeon to Roosevelt Hospital; Instructor in Surgery, Columbia University.

THE relative merit of the operative treatment of cleft palate as compared to the treatment with dental obturators, has long been a matter of dispute. It is not my purpose to enter into a discussion of this aspect of the subject, as my cases are too recent to exhibit final results as to improvement in speech, but rather to call attention to certain points in technique which aid in securing prompt surgical closure of the cleft with a minimum amount of damage to the muscles of the soft palate, so important an element in securing proper enunciation.

The Time to Operate.—Children six or seven years of age are, I believe, the most favorable subjects for operation from the purely surgical standpoint. The mouth is sufficiently large; the loss of blood and shock make little impression on a child of this age; the patients are old enough to give intelligent assistance in the after-treatment and to be taught to wear the protective dental plate to be described later. The very serious disadvantage is that habits of speech are already formed and the defect in pronunciation is undoubtedly more difficult to overcome. Whether we can expect enough gain in this respect, in operations performed at three years of age and under, to counterbalance the increased danger from shock and hemorrhage, the greater difficulty of technique due to the small size of the mouth and the delicacy of the flaps, and the fact that the patient is unable to give any intelligent assistance in the after-treatment, I am as yet unable to determine, as my experience in operating at this age is too limited and recent. With the operation in early infancy, ten days to three months of age, I have had no experience. Results in the hands of surgeons other than the originator of the method have certainly not been encouraging and a high rate of mortality is admitted. I have heard of no completely successful case operated upon in this city, and the published reports of the method which I have been able to find have been too vague and void of detail to afford any basis of comparison in regard to actual results.

---

[1] Read before the New York Surgical Society, October 25, 1905.

Anæsthetic, Position and Gag.—I have invariably used the hanging head, Rose position, intermittent ether anæsthesia with an open cone, and the Whitehead gag. I have never resorted to preliminary tracheotomy and do not believe that it should ever be necessary. In adjusting the tongue piece of the gag the tongue should be drawn well forward and to one side with a traction suture passed through its tip (see Fig. 1). If this is not done, as the tongue piece locks the base of the tongue is forced over the entrance to the larynx and breathing is interfered with. After the gag is in place the operator assures himself that breathing is unobstructed and regular before proceeding with the operation; if properly adjusted the gag need not be touched again until the operation is completed. The operator stands at the head of the patient, facing the feet, looking down on the palate from above. Blood and mucus collect in the naso-pharynx, which is easily kept clean by frequent sponging, and little if any blood should get into trachea or œsophagus.

Instruments.—The special instruments used are the Whitehead mouth gag (Fig 1); a very slender knife for transfixing the edge of the flap, paring and splitting the edge of the uvula (see Fig. 2; I have used a cataract knife); a long slender pair of mouse-tooth forceps (Fig. 4); a strong, straight scalpel for making the lateral incisions; a thin, blunt periosteal elevator, slightly curved on the flat; a sharply curved Deschamp's handle needle (Fig. 8, *a*) for passing the heavier sutures; the author's special needle-holder and needles for the

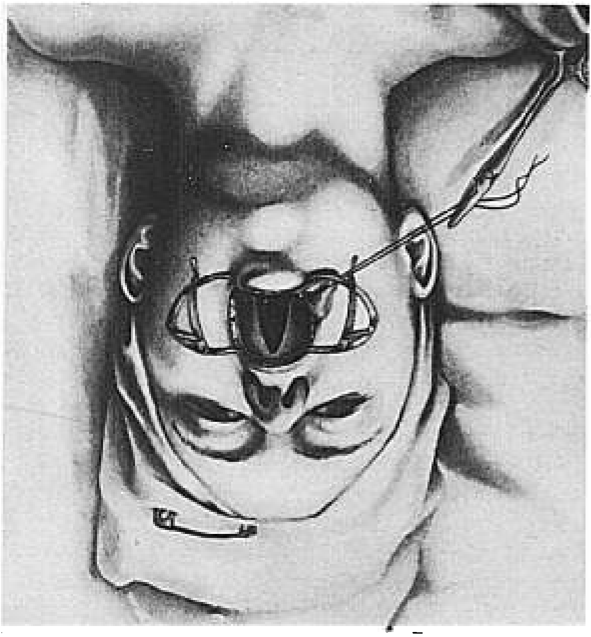

Fig. 1.—Head in Rose position; Whitehead gag in place with tongue drawn well forward and to one side.

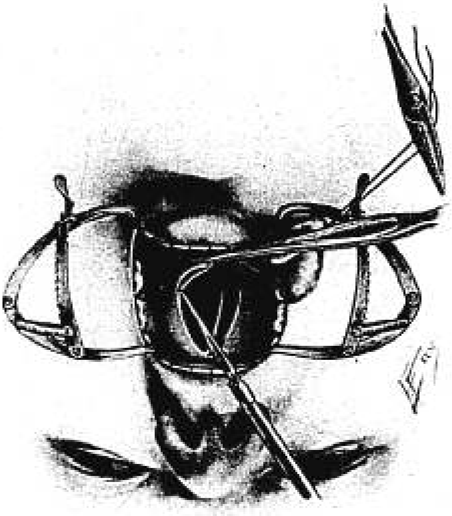

FIG. 2.—Paring the edges of cleft; the strip removed is very narrow and should terminate at base of uvula, the border of which is split; this is not shown in the drawing.

fine sutures (Fig. 8, *b, c,* and *d*). This special needle-holder is rather an adjustable handle than a needle-holder proper, and was designed with the assistance of W. F. Ford & Co., to enable the use of the very finest needles, made with an eye in the point, in order to secure accurate apposition without damaging the delicate edges of the flaps. The protective dental plates used in Cases VI and VII, first suggested I believe by Dr. Porter, of Boston, were made from casts of the mouth taken before operation, by Dr. Fiaschi. They keep the tongue off the suture line and are a valuable aid in the after-treatment. Children are easily taught to insert and remove the plate themselves without disturbing the flaps. Fig. 8, *e,* is a drawing of the plate used in Case VI.

The Operation.—The edges are pared by transfixing the edge of the soft palate with a very fine, sharp knife and cutting first forward to the anterior angle of the cleft, then backward, bringing the knife out at the base of the uvula; the strip removed should be as narrow as possible to avoid waste of tissue, but the full thickness of the flap. (Fig. 2.) The mucous membrane of the uvula is then split on its inner border, *i.e.* facing the cleft; it easily separates to give a sufficient raw surface and all of the tissue of the rudimentary half of the uvula is saved. This I believe to be an important modification of the method which I formerly employed, of removing a strip of tissue clear to the tip. The denudation is repeated on the opposite side of the cleft.

The lateral incisions are now made, commencing opposite the last molar tooth close to the border of the gums and carried forward to a point opposite the anterior extremity of the cleft, but taking great care to leave a broad anterior pedicle to the flap, for nutrition. This incision falls external to the posterior palatine foramen and the main trunk of the artery as it runs forward; branches are first divided, the main trunk being usually torn by the periosteal elevator. In clefts running forward through the alveolar process I prefer to leave the extreme anterior end of the cleft for later closure, rather than endanger the nutrition of the flaps by prolongation of the lateral incision and narrowing of the pedicle. Cases IV and VIII illustrate this condition.

Hemorrhage is free but soon stops spontaneously or with pressure applied with gauze pads on holders while the anæsthetic is resumed.

The curved periosteal elevator is then inserted in the lateral incision, and hugging the bone, is forced carefully through into the cleft; by lateral sweeps the entire flap is quickly separated, including the muco-periosteum at the anterior angle of incomplete clefts. Posteriorly the instrument is strongly carried outward and backward (Fig. 3) along the posterior margin of the hard palate, and to a great extent detaches the palatine aponeurosis and the mucous membrane on the nasal aspect of the velum from the bone. In the majority of cases hemorrhage soon ceases to be troublesome after this blunt separation: posterior branches of the descending palatine artery remain uninjured for nutrition of the posterior portion of the flap, even after very free separation with the raspatory. The inner edge of the flap is then seized with mouse-teeth forceps at the base of the soft palate, *i.e.* where the muscular pull concentrates (Fig. 4; the forceps are shown grasping the flap too far forward); a thin, straight bistoury is inserted through the posterior part of the lateral incision, and cutting outward and backward as traction on the flap is made toward the median line, the detachment of nasal mucous membrane and palatine aponeurosis from the posterior border of the hard palate is completed, and by a careful sawing motion enough of the mucous membrane of the naso-pharynx divided to allow the edges of the flap to fall to the median line without tension. Few if any of the fibres of the bellies of the levator or tensor palati are cut.

The palatine aponeurosis which receives the insertions of the tensor and levator, is completely detached from the posterior border of the hard palate as far outward as the base of the hamular process, together with the mucous membrane on the nasal aspect of the soft palate, allowing the velum to drop downward. This aponeurosis with its muscular insertions

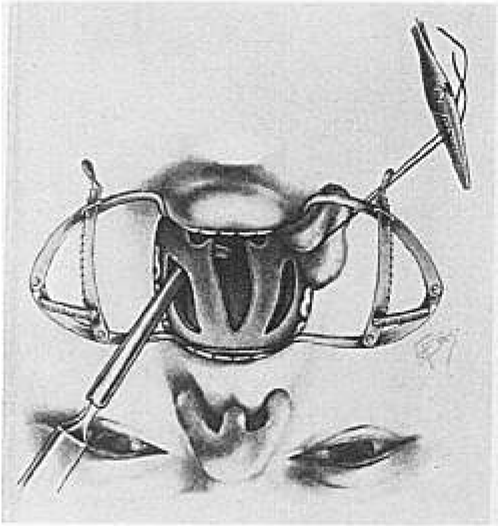

FIG. 3.—Elevating the muco-periosteal flap; the lateral incisions have been made; the elevator is inserted through lateral incision

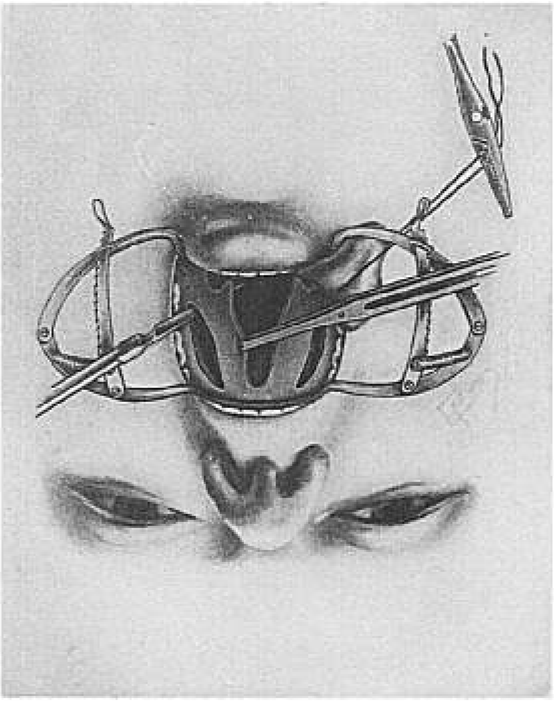

FIG. 4.—Relieving tension by dividing palatine aponeurosis and mucous membrane on nasal aspect at posterior border of hard palate; bistoury inserted through lateral incision cuts outward and backward; forceps shown grasping flap too far forward.

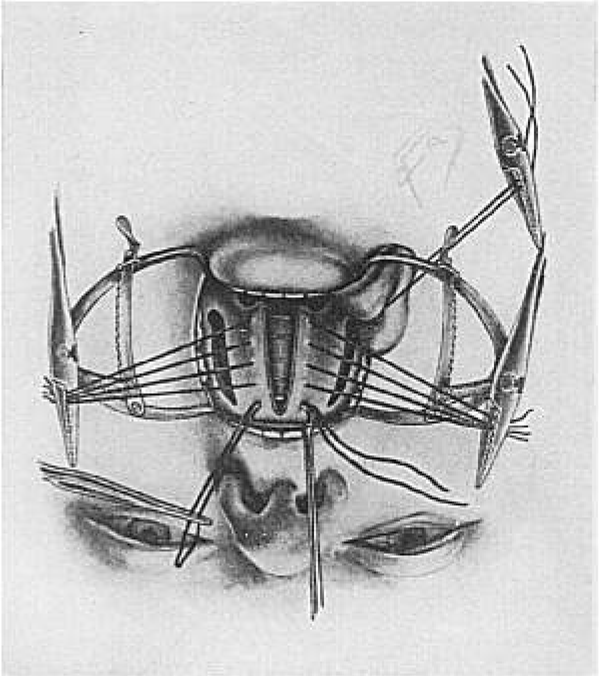

FIG. 5.—Four of the heavy sutures passed and ends secured; the fifth is being passed with the Deschamp needle, the loop grasped with thumb forceps as the needle is withdrawn.

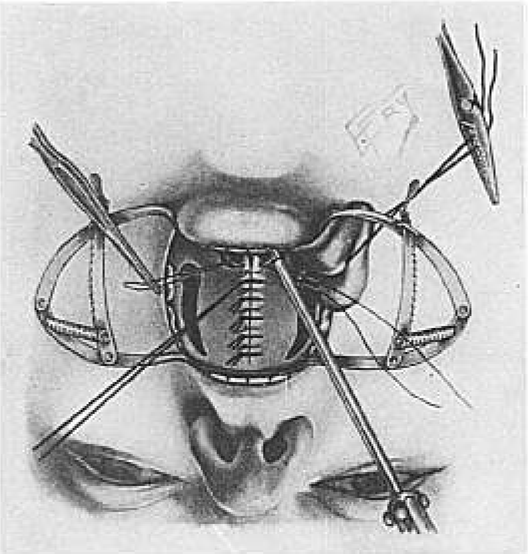

FIG. 6.—The heavy sutures have all been tied; the intermediate stitches have been passed and tied except the last one at tip of uvula, which is being passed with the fine special needle; the end of the last heavy suture is left long for traction during suture of uvula.

remains in the flaps. In cases of wide cleft, tension on the flaps is still caused by the shortened salpingo-palatine fold of mucous membrane running upward and backward on the lateral wall of the pharynx along the belly of the levator palati. Free division of this fold by gently tearing with the finger or snipping with blunt curved scissors as traction is made on the flap downward and inward to make it prominent, is easily accomplished without damaging the muscles, and effectually relieves tension. All this can be done without unduly narrowing the bridge of tissue behind, or endangering the nutrition of the flap.

By this time the hemorrhage has nearly ceased and the flaps are ready for suture. Beginning close to the base of the uvula, sutures of iron-dyed silk No. 6 are passed on the Deschamp's-handle needle through the entire thickness of both flaps at a sufficient distance from the edge to guard against cutting through; these are left untied until the last is passed, four or five being usually sufficient, placed one-fourth to one-third inch apart. They are then tied in order, with a surgeon's knot, usually beginning with the posterior stitch, the ends being left long for the time. Intermediate stitches of iron-dyed silk No. 3 are then placed between each of the heavier stitches, and two or three in the uvula itself, the last at its tip or even on the nasal aspect. They are passed on the very fine special needles with eye in the point, carried on the special needle-holder; they include only part of the thickness of the flap, are closer to the edge, are tied immediately and insure accurate apposition of the edges, such as is aimed at in all fine plastic work. Five to seven of these are used, making in all ten or twelve sutures (Fig. 6). The long ends of the heavier sutures are used for traction and steadying the flaps during the passage of the fine sutures, especially in bringing the uvula forward (Fig. 6). Each, as it has served its purpose, is cut short.

The operation is now completed except for the treatment of the lateral incisions. Formerly I packed these with a strip of sterile gauze, bringing the end out at the angle of the mouth and attaching it to the cheek with adhesive plaster. In my last two cases I have used a device suggested by C. H. Mayo: a piece of white tape is passed around both flaps through the lateral incisions, drawn just tight enough to approximate the flaps slightly and guard against tension, and secured by a silk ligature. The ends are cut short and slid around to the nasal surface of the flaps (Fig. 7). This is left in place seven days and serves for drainage as well as the relief of tension; I have been much pleased with its effect in the two cases mentioned.

The time required for the entire operation is about one hour, ranging from 55 to 65 minutes in six of my eight cases. One case was completed in 45 minutes and one took two hours. In none of my cases has the hemorrhage been at all alarming, nor has serious shock occurred.

After-Treatment.—I have made this very simple. Sterile water is given by mouth with a spoon after the first twelve hours; feeding with sterilized milk, given in the same way at frequent intervals, is commenced at the end of 24 hours, and the quantity increased rapidly to full milk diet. I have never resorted to rectal feeding and none of my patients has suffered seriously from lack of nutrition. The lips, teeth and tongue are kept clean with boric acid solution, but no attempt is made to cleanse the palate or nasal fossæ. I prefer to trust to the primary adhesion and disturb it as little as possible.

The use of the protective dental plate made by Dr. Fiaschi protects the suture line from the tongue, especially in the act of swallowing, and is of great value when the patient is old enough to allow its use. It should be removed every three or four hours, cleansed in boric acid solution and replaced, preferably by the patient himself. I first saw it used by Dr. J. A. Blake. Both of the cases in which I used it healed by primary union throughout, one of them having been operated upon three weeks before with total failure of union.

When packing is employed in the lateral incisions it is removed on the fifth or sixth day and usually not replaced. In the two cases in which I have employed the tape I have removed it on the seventh day. Stitches are usually removed on the ninth or tenth day. Many of the small defects which

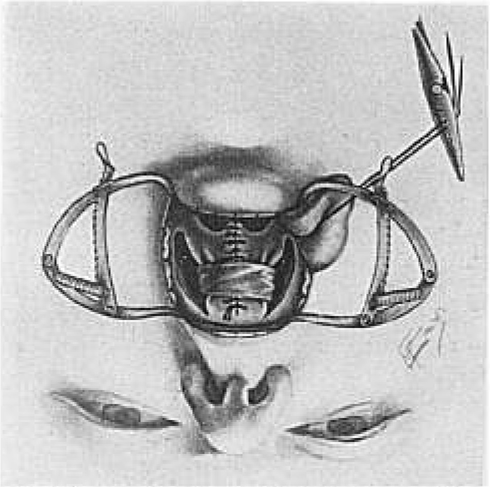

FIG. 7.—The tape has been passed through the lateral incisions around both flaps; the ends, fastened with a silk ligature and cut short, have been slid around to the nasal surface of the flaps.

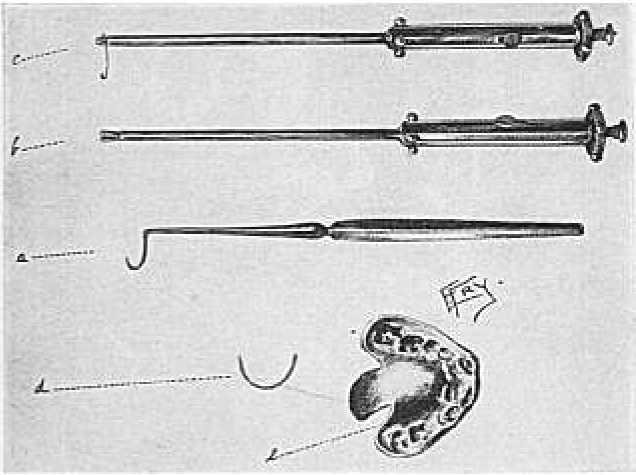

FIG. 8.—*a* right angled, half circle curved, Deschamp's handle needle with Hagedorn point; *b* author's special needle holder, open; *c* Author's special needle holder with needle in place; it is held very firmly; *d* special needle with eye in point; made very fine; half circle curved; surgeon's point; *e* Protective dental plate made by Dr. Fiaschi for Case VI; fits over upper teeth and gums and is held by suction; tail piece to protect soft palate and uvula

so frequently occur at the junction of the hard and soft palate will heal by granulation in two or three weeks; persistent ones or defects in the uvula are closed by secondary suture.

Case I.—Male, nineteen years of age; lumberman. Operated upon at Roosevelt Hospital, service of Dr. R. F. Weir, February 16, 1904, for complete cleft of soft and hard palate extending forward to incisor teeth. Cleft wide, arch high, no previous operation; right unilateral harelip. Palate operated upon in the usual way; lateral incisions packed with sterile gauze; no protective plate used.

Plastic on harelip performed at same sitting; time of operation two hours; intermittent ether anæsthesia used. Healing complete by primary union except for a small defect at junction of hard and soft palates which closed by granulation in a few weeks. Left hospital on March 1, 1904. Examined May 1, 1904: defect above mentioned entirely closed but another very small opening had appeared at anterior extremity of cleft. Improvement in speech very slight. Case not seen since May 1, 1904.

Case II.—Male, ten years of age; schoolboy. Operated upon at Roosevelt Hospital, service of Dr. R. F. Weir, April 9, 1904, for complete cleft of soft and about two-thirds of hard palate. Usual operation performed; time of operation sixty-five minutes.

Complete healing by primary union with no defects; stitches removed on ninth day; no protective plate used. Left hospital April 20, 1904.

Examined October 18, 1905; no defects; soft palate moves freely; improvement in speech only fair.

Case III.—Male, four years of age. Operated upon at Roosevelt Hospital, service of Dr. G. E. Brewer, July 19, 1904, for complete cleft of soft and about two-thirds of hard palate. Usual operation performed; time of operation 60 minutes; no protective plate used. About the third day after operation child put finger in mouth and broke suture line in anterior portion of hard palate. Another small defect occurred at junction of hard and soft palates, the remainder of the suture line healing by first intention.

An attempt was made to close defects by secondary suture on July 31, 1904, with only partial success, but at time of discharge from hospital, August 2, 1904, both defects were very small.

Patient had not begun to talk prior to operation: he was examined October 18, 1905; he is learning to talk and makes himself easily understood, his parents say, and pronounces many words very well indeed.

Case IV.—Male, twenty-one years of age. Operated upon at Roosevelt Hospital, service of Dr. G. E. Brewer, July 27, 1904, for very wide, complete cleft of hard and soft palates, extending forward through alveolar process. Harelip had been successfully closed in infancy. The usual operation was performed, no attempt being made to close the extreme anterior end of defect on account of danger to nutrition of flaps. Complete healing by primary union except for a small defect at junction of hard and soft palates which closed by granulation in about four weeks. Left hospital on August 2, 1904, but reported at intervals for several weeks; he failed to return for operation to complete closure of anterior portion of cleft. When last seen improvement in speech was not very marked.

Case V.—Female, six years of age. Operated upon at Roosevelt Hospital, service of Dr. G. E. Brewer, March 29, 1905, for complete cleft of soft palate extending about three-fourths inch into hard palate. A large adenoid was removed from the nasopharynx, and the usual operation for cleft palate performed; total time of operation 45 minutes. Healing complete by primary union except uvula, which separated and was closed by secondary suture May 31, 1905, healing promptly. No protective plate used.

Examined October 18, 1905; palate perfect except that uvula is diminutive; improvement in speech very marked; pronounces many words perfectly, defect in enunciation seeming hardly more than a lisp.

Case VI.—Male, seven years of age. Operated upon at Roosevelt Hospital, service of Dr. G. E. Brewer, May 13, 1905, for complete cleft of soft palate extending forward into hard palate about three-fourths inch. Operation performed three weeks ago by another surgeon resulted in complete failure of union. The usual operation performed; time of operation sixty-five minutes. Protective plate made by Dr. Fiaschi used in after-treatment; complete healing by primary union with no defects; stitches removed on the ninth day. Left hospital able to insert and remove plate himself for cleansing, without touching suture line. Examined October 18, 1905; palate perfect except that uvula, as in Case V, was small, owing partly to the fact that in each the uvula was operated upon a second time. Improvement in speech only fair.

CASE VII.—Male, seven years of age. Operated upon at Roosevelt Hospital, service of Dr. G. E. Brewer, September 22, 1905, for wide cleft of soft palate extending forward to middle of hard palate. Adenoids were operated upon nine days before. The usual operation performed; time of operation fifty-eight minutes. The tape around the flaps was used instead of packing in the lateral incisions; the Fiaschi protective plate was used in the after-treatment. Complete healing by primary union with no defects; stitches removed on the ninth day. Left hospital seven days after operation because he developed chicken-pox.

Improvement in speech is slight as yet.

CASE VIII.—Female, two years five months of age. Operated upon at Roosevelt Hospital, service of Dr. G. E. Brewer, October 12, 1905, for complete cleft of soft and hard palate, extending forward through the alveolar process. Harelip had been closed in early infancy. The usual operation performed, no attempt being made to close the extreme anterior end of the cleft on account of danger to the nutrition of the flaps. Time of operation fifty-five minutes. Tape around flaps instead of packing; no protective plate used as child was too young. Healing of the greater portion of the suture line, the uvula and one stitch in front giving way. Secondary operation will be performed in a few weeks.

The child has not learned to talk as yet, and should prove a good subject in which to study the effect of the operation performed at this early age. A sharp bronchitis complicated the first few days of convalescence.

Summary.—Of the eight cases, three healed primarily with no defects (Cases II, VI, and VII); one after a secondary suture of the uvula (Case V); one is completely healed except for a small anterior defect purposely left to preserve nutrition of flaps (Case IV); two have very slight defects barely admitting a probe (Cases I and III); and one, the most recent, has a defect of the uvula and also an anterior defect purposely left, both of which I hope to close by secondary operation within a few weeks (Case VIII). All of the defects mentioned in Cases I, III, IV and VIII could be easily closed by secondary operation if it were possible to follow the cases and get them to consent to such procedure, as I hope to do in Cases IV and VIII.

The time spent in the hospital after operation in Cases I to VIII respectively, was 19, 11, 14, 6, 30, 7, 13, and 13 days. None of the cases suffered to any extent from shock or hemorrhage; two had rather sharp bronchitis following the operation, which soon subsided; all were fed by mouth after the first 24 hours. Intermittent ether anæsthesia, with an open, sterile cone was used in all the cases; the time of operation varied from forty-five minutes to two hours, usually fifty-five to sixty-five minutes, a considerable portion of this time being consumed in arresting hemorrhage and renewing anæsthesia. The only suture material employed has been fine iron-dyed silk, No. 6 and No. 3.

Conclusions.—The operation as described is essentially the operation of Langenbeck, and is capable of closing the cleft, if properly carried out, in nearly if not quite all cases of cleft palate, either in children or adults.

The easiest age to operate is from six to ten years, the best age probably from two to three years if it can be demonstrated that the danger is not too great.

The Rose position and the use of the Whitehead gag add greatly to the ease of exposure and control of hemorrhage.

The bellies of levator and tensor palati with their insertions into the palatine aponeurosis, should be preserved, but the attachment of the aponeurosis to the posterior margin of hard palate must be divided, together with the mucous membrane on the nasal aspect of the velum.

Complete relief of tension is essential, and division of the salpingo-palatine fold of mucous membrane is important to secure this.

Suturing should be as carefully done as in any fine plastic operation, and with needles that are sufficiently delicate to avoid injury to the edges of the flaps.

The after-treatment should be simple; no cleansing should be attempted on the palate or in the nasal fossæ; feeding by mouth should be commenced at the end of twenty-four hours. The use of the protective plate is of great value in older children and adults.